FIG. 1

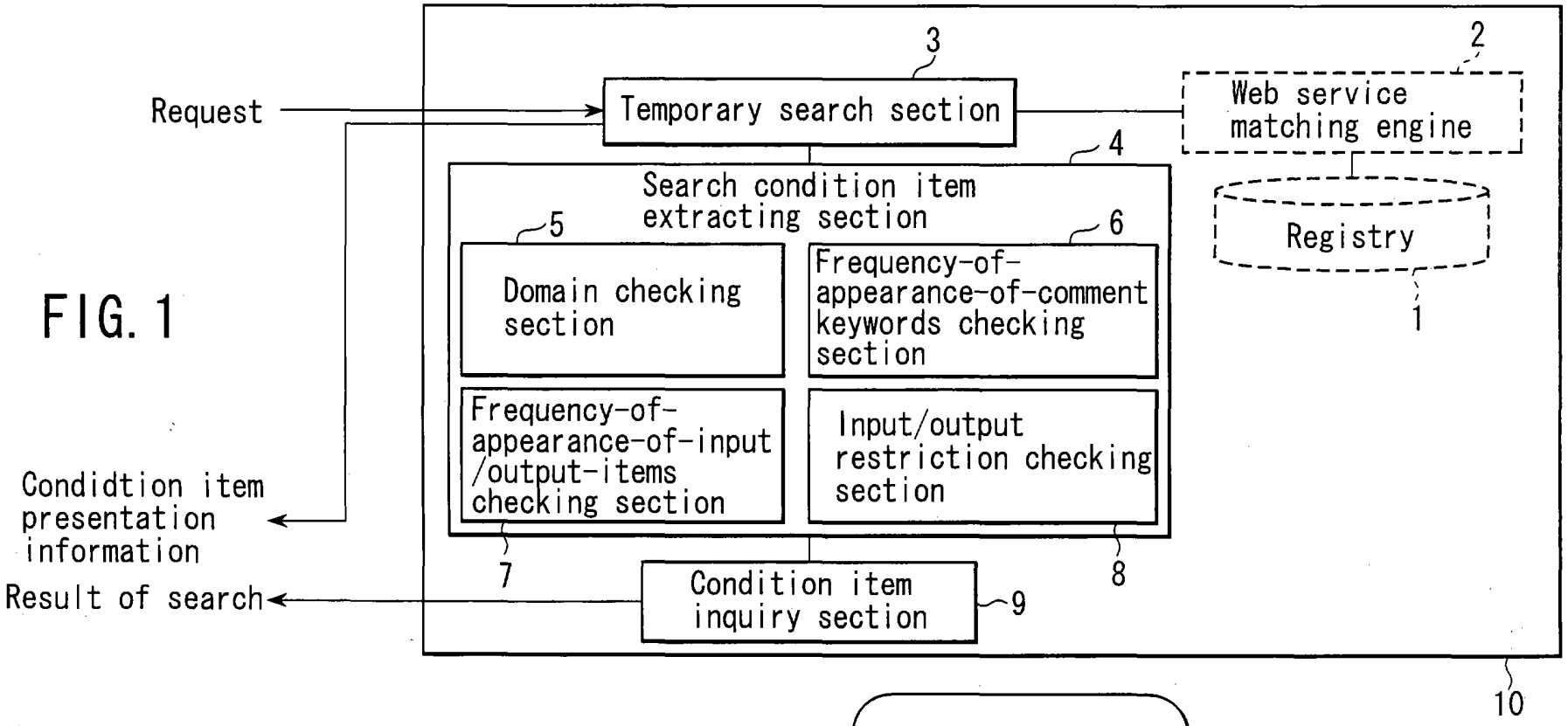
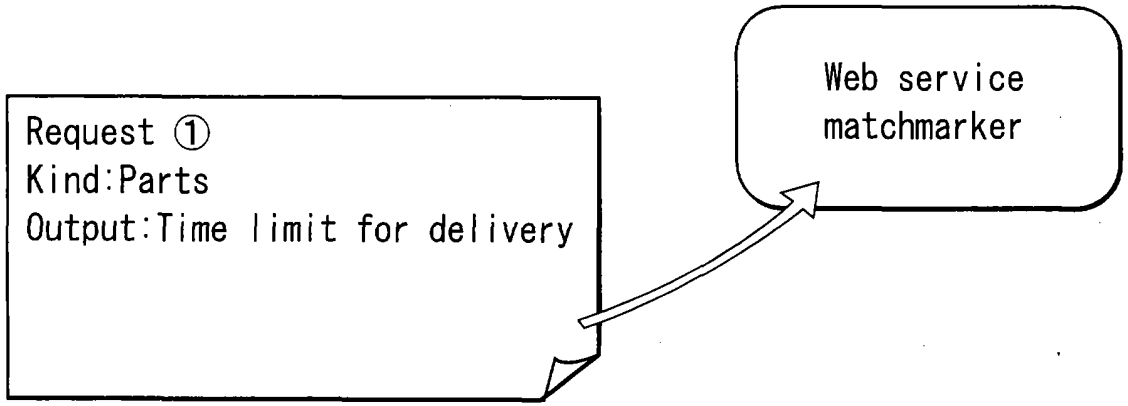

Request
Temporary search section
3
Web service matching engine
2
Search condition item extracting section
4
5
6
Domain checking section
Frequency-of-appearance-of-comment keywords checking section
Registry
1
Frequency-of-appearance-of-input/output-items checking section
Input/output restriction checking section
7
8
Condidtion item presentation information
Result of search
Condition item inquiry section
9
10

FIG. 2


Request ①
Kind:Parts
Output:Time limit for delivery
Web service matchmarker

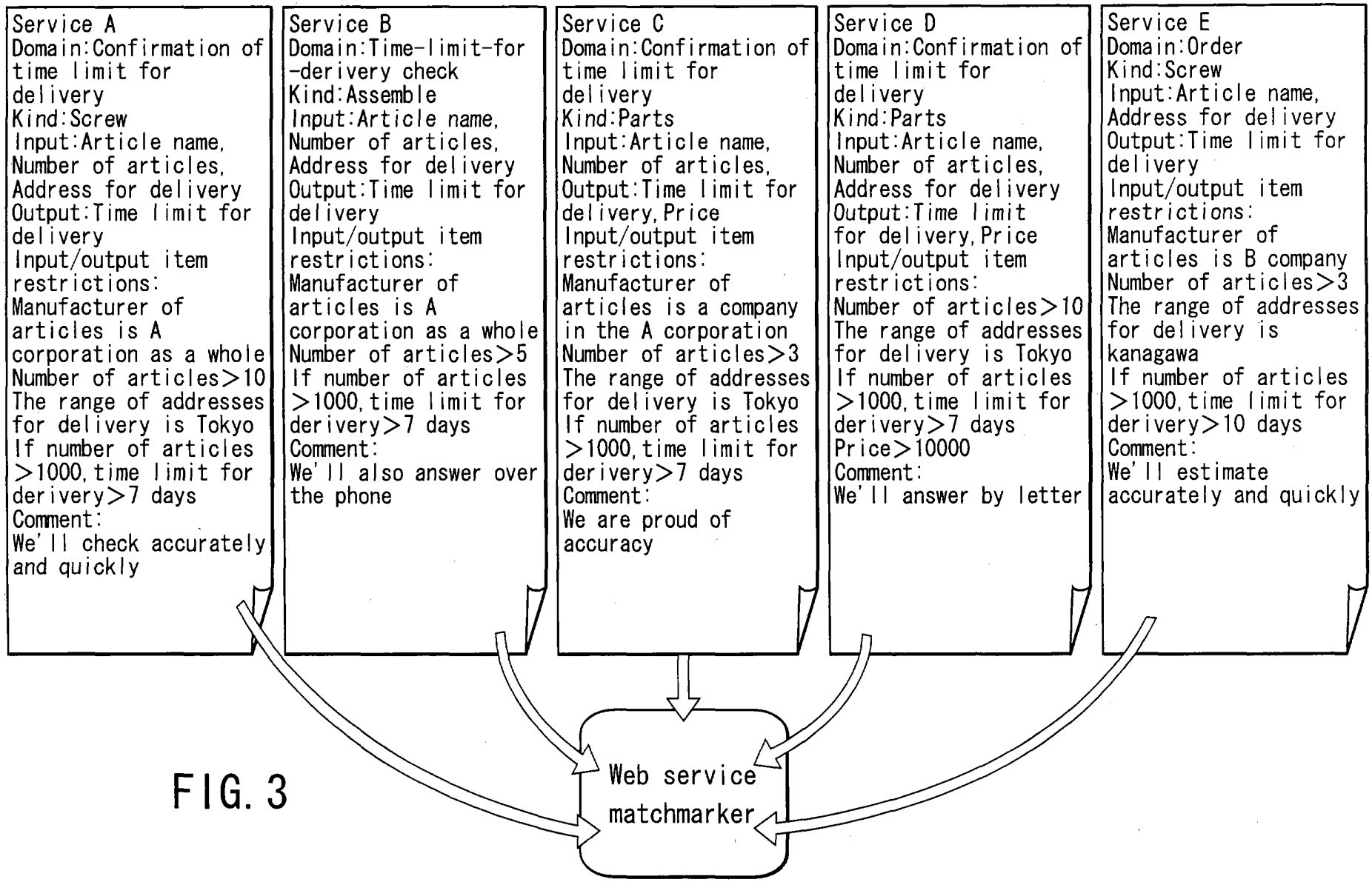

Service A
Domain:Confirmation of time limit for delivery
Kind:Screw
Input:Article name, Number of articles, Address for delivery
Output:Time limit for delivery
Input/output item restrictions:
Manufacturer of articles is A corporation as a whole
Number of articles>10
The range of addresses for delivery is Tokyo
If number of articles >1000, time limit for derivery>7 days
Comment:
We'll check accurately and quickly
Service B
Domain:Time-limit-for-derivery check
Kind:Assemble
Input:Article name, Number of articles, Address for delivery
Output:Time limit for delivery
Input/output item restrictions:
Manufacturer of articles is A corporation as a whole
Number of articles>5
If number of articles >1000, time limit for derivery>7 days
Comment:
We'll also answer over the phone
Service C
Domain:Confirmation of time limit for delivery
Kind:Parts
Input:Article name, Number of articles, Output:Time limit for delivery, Price
Input/output item restrictions:
Manufacturer of articles is a company in the A corporation
Number of articles>3
The range of addresses for delivery is Tokyo
If number of articles >1000, time limit for derivery>7 days
Comment:
We are proud of accuracy
Service D
Domain:Confirmation of time limit for delivery
Kind:Parts
Input:Article name, Number of articles, Address for delivery
Output:Time limit for delivery, Price
Input/output item restrictions:
Number of articles>10
The range of addresses for delivery is Tokyo
If number of articles >1000, time limit for derivery>7 days
Price>10000
Comment:
We'll answer by letter
Service E
Domain:Order
Kind:Screw
Input:Article name, Address for delivery
Output:Time limit for delivery
Input/output item restrictions:
Manufacturer of articles is B company
Number of articles>3
The range of addresses for delivery is kanagawa
If number of articles >1000, time limit for derivery>10 days
Comment:
We'll estimate accurately and quickly
Web service matchmarker

FIG. 3

Domain checking	Domain name	Category			
	Confirmation of time limit for delivery	Confirmation of time limit for delivery			
	Time-limit-for-delivery checking	Confirmation of time limit for delivery			← Domain checking section output
	Confirmation of time limit for delivery	Confirmation of time limit for delivery			
	Order	Order			
	Order	Order			
Comment checking	Keyword	Frequency of appearance			
	Accurate	3			
	Quick	2			← Frequency-of-appearance-of-comment-keywords checking section output (specified number=1)
	Document	1			
	Telephone	1			
Input/output items	Input item	Frequency of appearance	Output item	Frequency of appearance	
	Article name	5	Time limit for derivery	5	
	Number of articles	4	Price	2	← Frequency-of-appearance-of-input/output-items checking section output (specified number=1)
	Address for delivery	4			
Input/output restrictions	Items	Restrictions, conditions	Frequency of appearance		
	Number of articles	MInimum number of articles	5		
	Time limit for delivery	Earliest time limit for delivery	5		
	Article name	Manufacturer	4		← Input-output restrictions checking section output (specified number=1)
	Address for delivery	Range	4		
	Price	Lowest price	1		

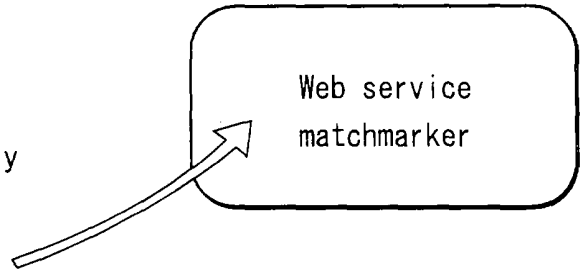
FIG. 4

Domain item	Confirmation of time limit for delivery	
(Either)	Order	
Keyword	Accurate	
(Isn't there any interesting word ?)	Quick	
Input items and restrictions	Input item	Example of restriction(or restrictions if any)
(Isn't there any restriction to be	Article name	Manufacturer
specified as a possible input item ?)	Number of articles	Minimum number of articles
	Address for delivery	Range
Output items and restrictions	Output item	Restriction
(Isn't there any restriction to be	(Time limit for delivery)	Earliest time limit for delivery
specified as a desired output item ?)	Price	———

FIG. 5

FIG. 6

Request ①
Domain:Confirmation of time limit for derivery
Kind:Parts
Input:Article name, Number of articles, address for delivery
Output:Time limit for delivery
Conditions:
Manufacturer of articles is Toshiba TEC
Number of articles>5
The range of addresses for delivery is a metropolitan area
If number of articles>1000, time limit for delivery>7 days
Keyword:Accurate



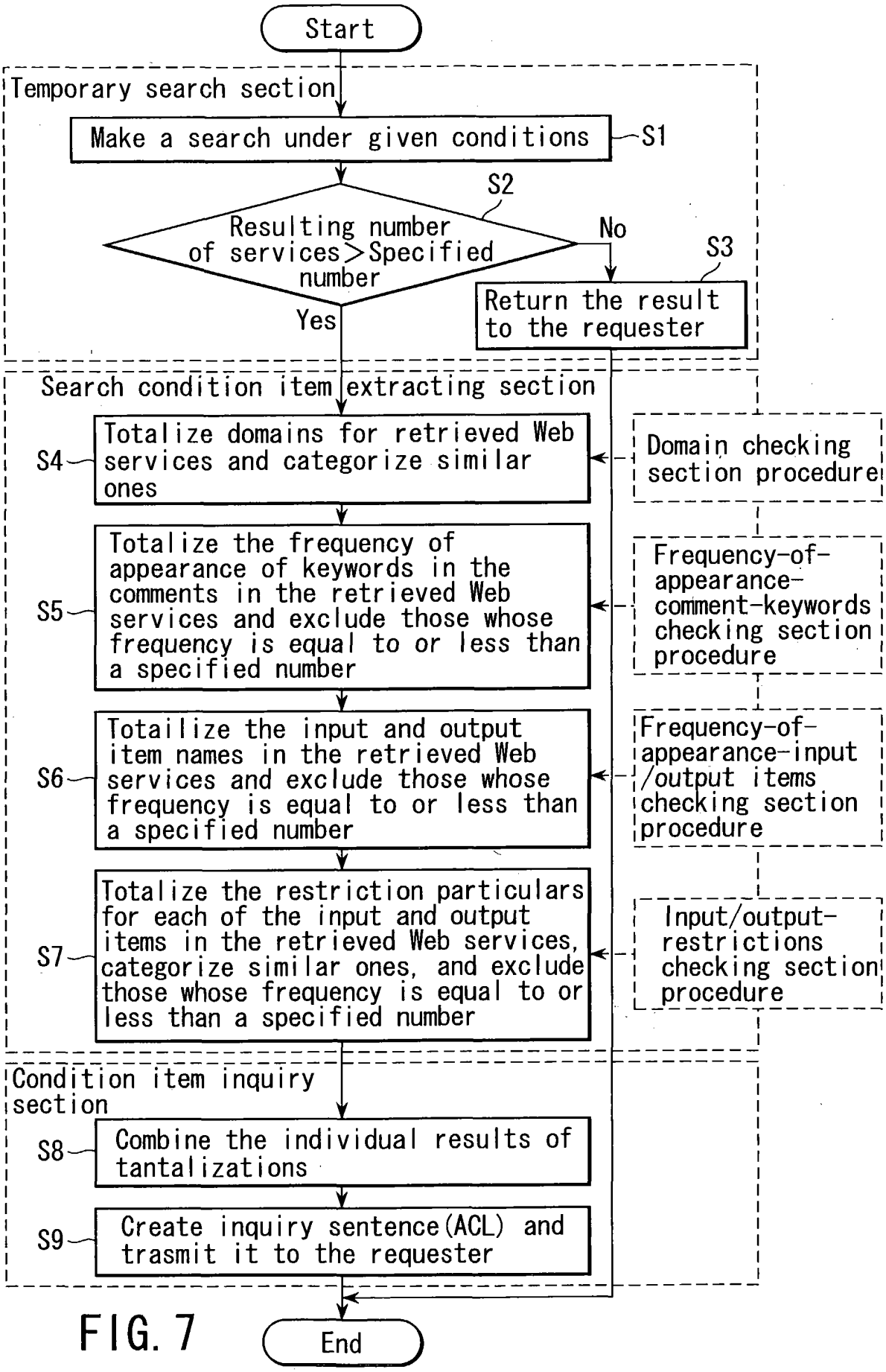

Start
Temporary search section
Make a search under given conditions
S1
S2
Resulting number of services > Specified number
No
S3
Return the result to the requester
Yes
Search condition item extracting section
S4
Totalize domains for retrieved Web services and categorize similar ones
Domain checking section procedure
S5
Totalize the frequency of appearance of keywords in the comments in the retrieved Web services and exclude those whose frequency is equal to or less than a specified number
Frequency-of-appearance-comment-keywords checking section procedure
S6
Totailize the input and output item names in the retrieved Web services and exclude those whose frequency is equal to or less than a specified number
Frequency-of-appearance-input/output items checking section procedure
S7
Totalize the restriction particulars for each of the input and output items in the retrieved Web services, categorize similar ones, and exclude those whose frequency is equal to or less than a specified number
Input/output-restrictions checking section procedure
Condition item inquiry section
S8
Combine the individual results of tantalizations
S9
Create inquiry sentence(ACL) and trasmit it to the requester
End

FIG. 7

FIG. 8

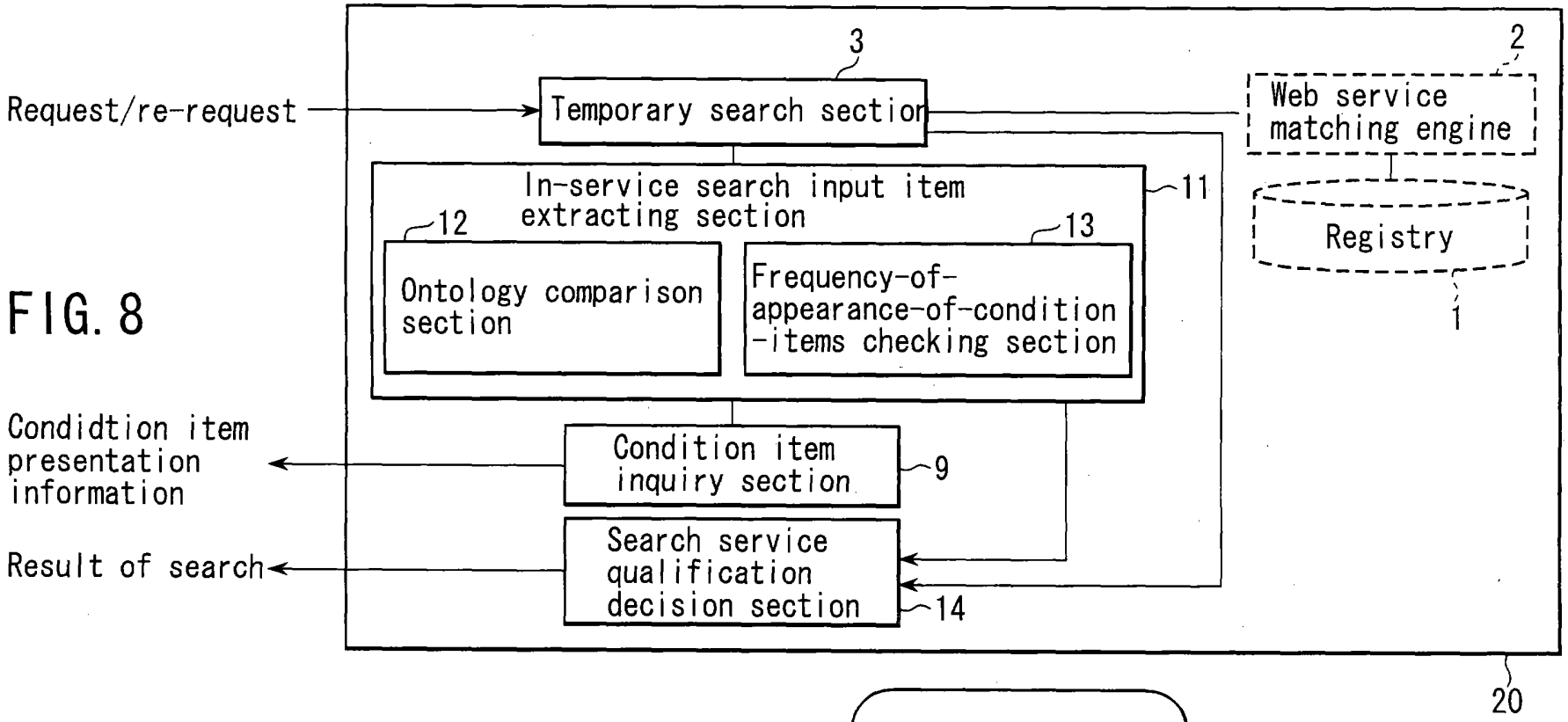
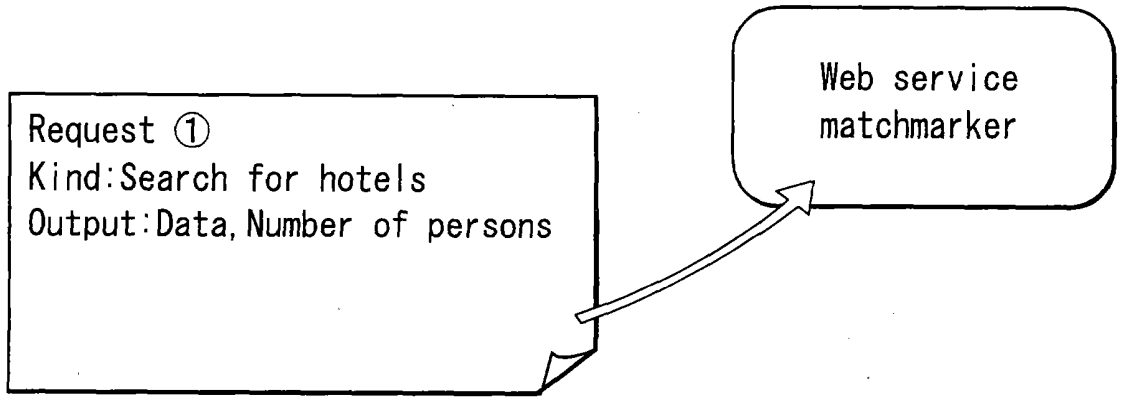

Request/re-request
3
Temporary search section
2
Web service matching engine
In-service search input item extracting section
11
12
13
Ontology comparison section
Frequency-of-appearance-of-condition-items checking section
Registry
1
Condidtion item presentation information
Condition item inquiry section
9
Result of search
Search service qualification decision section
14
20

FIG. 9


Request ①
Kind:Search for hotels
Output:Data, Number of persons
Web service matchmarker

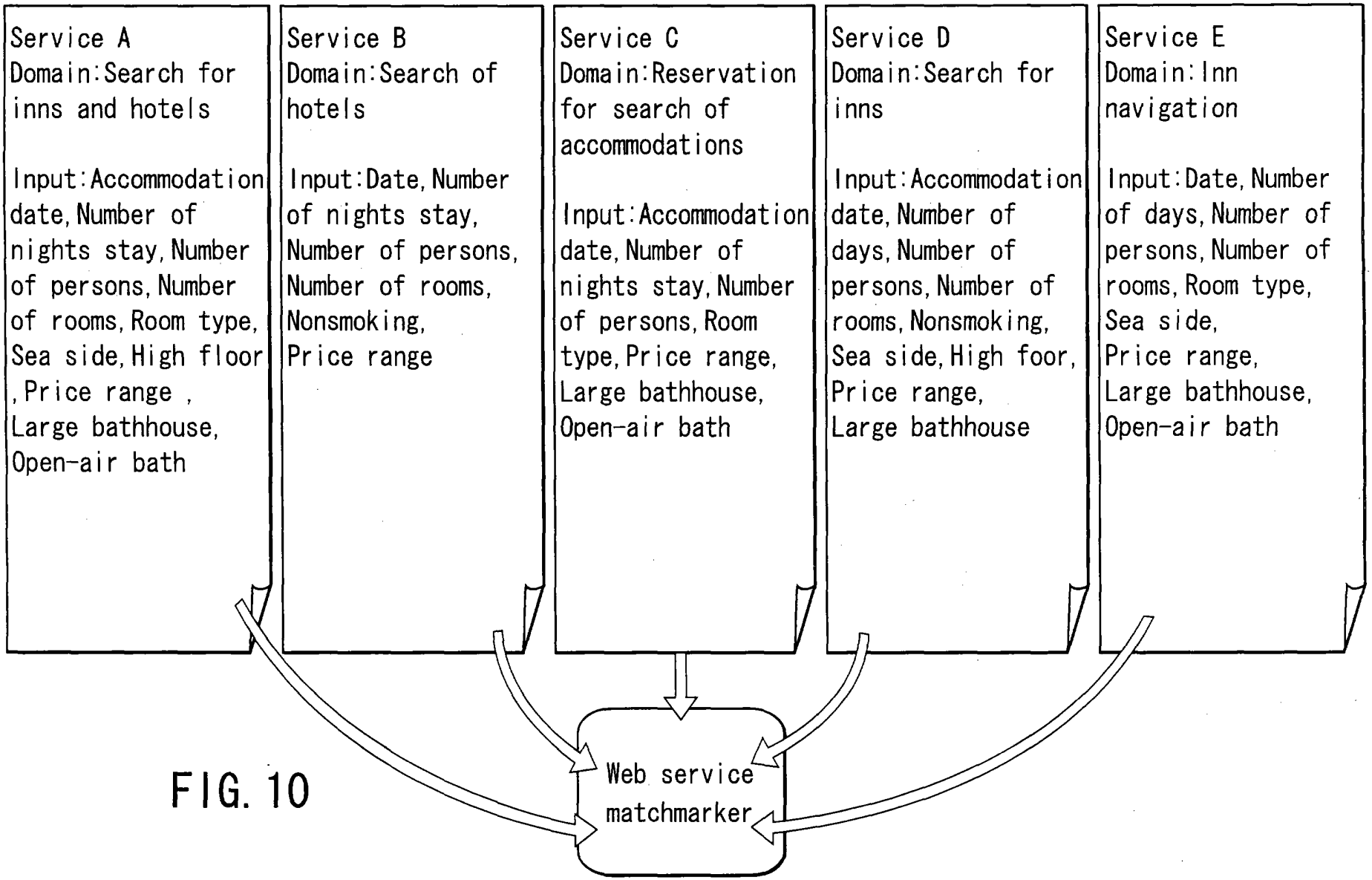

Service A
Domain:Search for inns and hotels
Input:Accommodation date, Number of nights stay, Number of persons, Number of rooms, Room type, Sea side, High floor , Price range , Large bathhouse, Open-air bath
Service B
Domain:Search of hotels
Input:Date, Number of nights stay, Number of persons, Number of rooms, Nonsmoking, Price range
Service C
Domain:Reservation for search of accommodations
Input:Accommodation date, Number of nights stay, Number of persons, Room type, Price range, Large bathhouse, Open-air bath
Service D
Domain:Search for inns
Input:Accommodation date, Number of days, Number of persons, Number of rooms, Nonsmoking, Sea side, High foor, Price range, Large bathhouse
Service E
Domain:Inn navigation
Input:Date, Number of days, Number of persons, Number of rooms, Room type, Sea side, Price range, Large bathhouse, Open-air bath
Web service matchmarker

FIG. 10

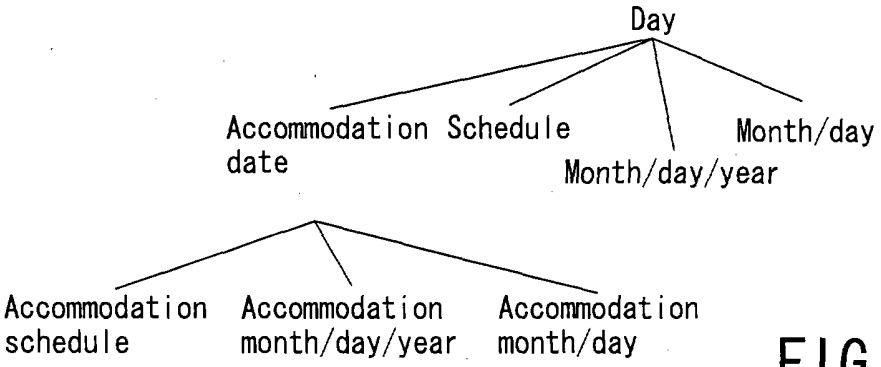


FIG. 11A

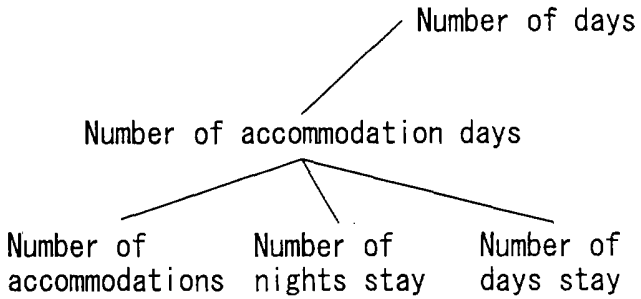


FIG. 11B

FIG. 12

Service A	Service B	Service C	Service D	Service E
Accommodation date		Accommpdation date	Accommpdation date	
	Date			Date
Number of nights stay	Number of nights stay	Number of nights stay		
			Number of days	Number of days
Number of persons	Number of persons	Number of persons	Number of persons	Number of persons
Number of rooms	Number of rooms		Number of rooms	Number of rooms
Room type		Room type		Room type
	Nonsmoking		Nonsmoking	
Sea side			Sea side	Sea side
High floor			High floor	
Price range	Price range	Price range	Price range	Price range
Large bath		Large bath	Large bath	Large bath
Open-air bath		Open-air bath		Open-air bath

Service A	Service B	Service C	Service D	Service E
Accommodation date	Date	Accommodation date	Accommodation date	Date
Number of nights stay	Number of nights stay	Number of nights stay	Number of days	Number of days
Number of persons	Number of persons	Number of persons	Number of persons	Number of persons
Number of rooms	Number of rooms		Number of rooms	Number of rooms
Room type		Room type		Room type
	Nonsmoking		Nonsmoking	
Sea side			Sea side	Sea side
High floor			High floor	
Price range	Price range	Price range	Price range	Price range
Large bath		Large bath	Large bath	Large bath
Open-air bath		Open-air bath		Open-air bath

FIG. 13

Service A	Service B	Service C	Service D	Service E	Frequency of appearance
Accommodation date	Date	Accommodation date	Accommodation date	Accommodation date	5
Number of nights stay	Number of nights stay	Number of nights stay	Number of days	Number of days	5
Number of persons	Number of persons	Number of persons	Number of persons	Number of persons	5
Number of rooms	Number of rooms		Number of rooms	Number of rooms	4
Room type		Room type		Room type	3
	Nonsmorking		Nonsmorking		2
Sea side			Sea side	Sea side	3
High floor			High floor		2
Price range	Price range	Price range	Price range	Price range	5
Large bath		Large bath	Large bath	Large bath	4
Open-air bath		Open-air bath		Open-air bath	3

FIG. 14

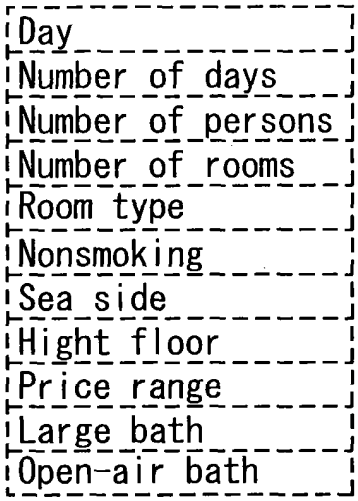


FIG. 15

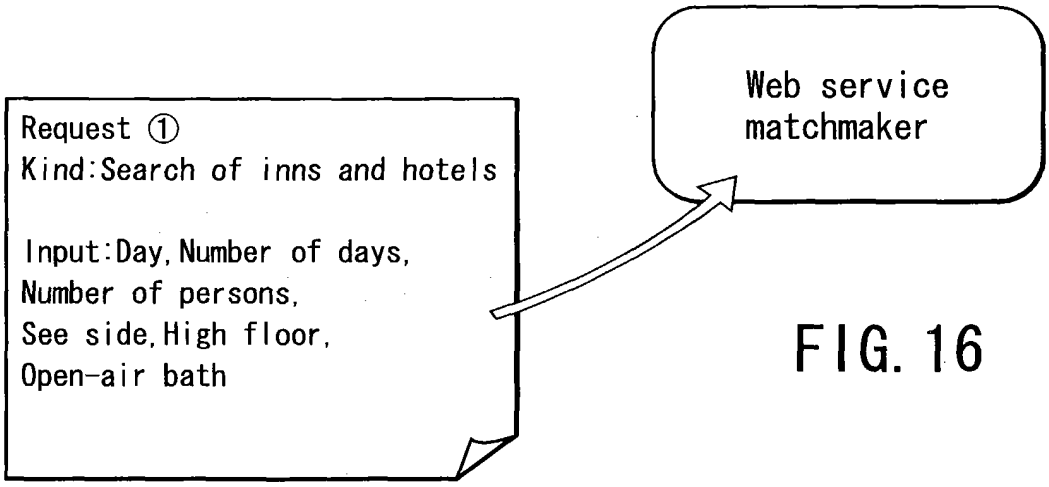


FIG. 16

Service A	Service B	Service C	Service D	Service E
6	3	4	5	5

FIG. 17

Ranking	Service name
1	Service A
2	Service D
2	Service E
4	Service C
5	Service B

FIG. 18

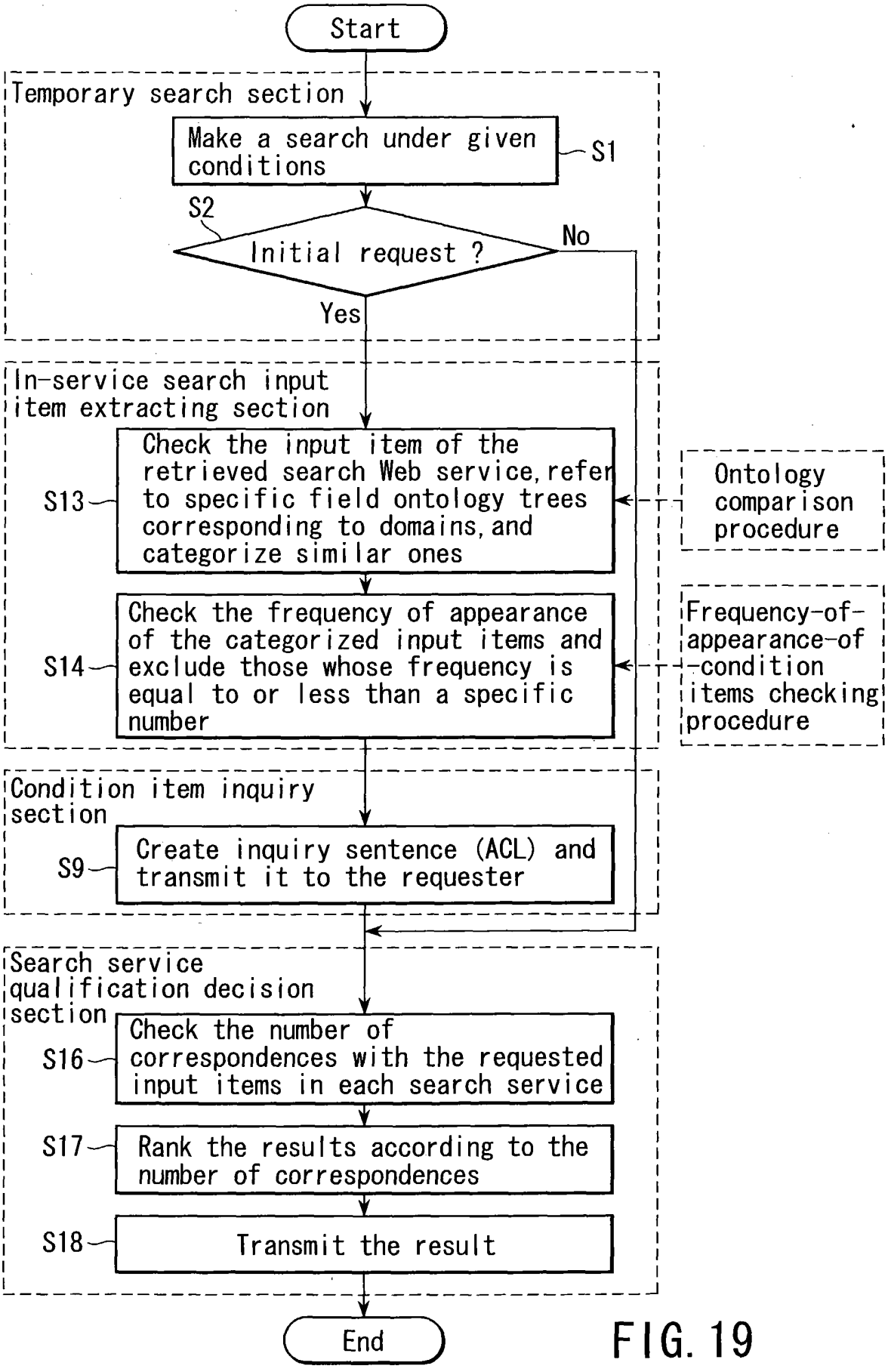

Start
Temporary search section
Make a search under given conditions
S1
S2
Initial request ?
No
Yes
In-service search input item extracting section
S13
Check the input item of the retrieved search Web service, refer to specific field ontology trees corresponding to domains, and categorize similar ones
Ontology comparison procedure
S14
Check the frequency of appearance of the categorized input items and exclude those whose frequency is equal to or less than a specific number
Frequency-of-appearance-of-condition items checking procedure
Condition item inquiry section
S9
Create inquiry sentence (ACL) and transmit it to the requester
Search service qualification decision section
S16
Check the number of correspondences with the requested input items in each search service
S17
Rank the results according to the number of correspondences
S18
Transmit the result
End

FIG. 19